PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Triage tests for identifying atrial fibrillation in primary care: a diagnostic accuracy study comparing single lead ECG and modified BP monitors
AUTHORS	Kearley, Karen; Selwood, Mary; van den Bruel, Ann; Thompson, Matthew; Mant, David; Hobbs, Richard; Fitzmaurice, DA; Heneghan, Carl

VERSION 1 - REVIEW

REVIEWER	Dr Vias Markides Royal Brompton & Harefield NHS FT, London, UK
REVIEW RETURNED	02-Jan-2014

GENERAL COMMENTS	This is a well conducted study which helps answer an extremely important question relating to opportunistic screening for AF. Given the availability of a simple intervention to greatly modify risk if AF is identified (warfarin), this has very substantial implications in the UK and wider healthcare environment. The simplicity of the MicroLife device and reasonable sensitivity and specificity are highlighted. Whether the 95% sensitivity is adequate is a matter of debate, but it outperforms other devices in applicability and deliverability (including low false +ve rate). An excellent paper. This is clearly an evolving field, with novel, internet-connected devices including the offer of centralised analysis now on the market which could be acknowledged in the discussion section but these remain unvalidated in this setting.

REVIEWER	George S. Stergiou Hypertension Center, Third University Department of Medicine, Sotiria Hospital, Athens, Greece Received consultation fees by Microlife blood pressure monitor manufacturer.
REVIEW RETURNED	07-Jan-2014

GENERAL COMMENTS	This is an interesting study with important implications for general practice, particularly because of the growing atrial fibrillation epidemic and the fact the condition often remains undetected until a stroke occurs. Strengths of this paper are the large study sample, the primary care setting and the direct comparison of three screening tools against the reference method in the same subjects. There are several methodological issues that need to be clarified or discussed before this interesting paper is accepted for publication at

	the BMJ Open journal. 1. The results of the two ECG tracing devices should have been assessed by general practitioners instead of cardiologists, as it is expected to be the case in practice, and then compared to reference method, namely 12-lead ECG evaluated by cardiologist. The approach used in the study probably overestimated the diagnostic performance of the two ECG tracing devices compared to what can be achieved in clinical practice, given that there are known problems with the diagnosis of atrial fibrillation by general practitioners using ECG (see Mant et al. BMJ 2007;335:380-5). 2. Since the test devices and the reference 12-lead ECG were applied sequentially without simultaneous ECG monitoring, intermittent atrial fibrillation or other arrhythmia might have resulted in false positive or negative results in some cases. 3. Any comment about fall positive atrial fibrillation in case or other arrhythmias, e.g. multiple ectopic beats detected by the blood pressure monitor? 4. When was nurse pulse palpation performed as mentioned in the abstract? There is no such information or results in the Results section of the paper. 5. How many measurements were taken using the WatchBP monitor to detect atrial fibrillation? How was the atrial fibrillation diagnosis defined by this method? 6. What is the cost of the three devices compared in this study? 7. Apart from the devices' cost, the cost of the doctor's time to interpret the ECG trace should be taken into account in the cost-effectiveness evaluation.

VERSION 1 – AUTHOR RESPONSE

Reviewer: Markides
No comments needed in response to this review.

Reviewer: Stergiou
1. The results of the two ECG tracing devices should have been assessed by general practitioners instead of cardiologists, as it is expected to be the case in practice, and then compared to reference method, namely 12-lead ECG evaluated by cardiologist. The approach used in the study probably overestimated the diagnostic performance of the two ECG tracing devices compared to what can be achieved in clinical practice, given that there are known problems with the diagnosis of atrial fibrillation by general practitioners using ECG (see Mant et al. BMJ 2007;335:380-5).

Response: We did not assess GP's assessment of the single lead ECG tracing devices, and as the Reviewer points out the Cardiology readers may have had greater expertise and thus were more likely to correctly diagnose AF using these devices. We agree that this may have overestimated the performance of the single lead ECG device and have added this to the discussion section. This further supports the use of devices that provide automated signals or auto analysis of rhythms.

2. Since the test devices and the reference 12-lead ECG were applied sequentially without simultaneous ECG monitoring, intermittent atrial fibrillation or other arrhythmia might have resulted in false positive or negative results in some cases.

Response: We agree that it is theoretically possible that a patient with intermittent AF may have resulted in false positive or negative results given the practicality of applying the index tests sequentially and not simultaneously. However the time frame for the application of the tests was very

small, we would estimate 10 mins, thus the risk of this occurring would be small. This point has been added to the Discussion section

3. Any comment about false positive atrial fibrillation in case of other arrhythmias, e.g. multiple ectopic beats detected by the blood pressure monitor?

Response: We cannot comment on possible causes of false positive AF indications for the BP monitor as this was not collected on analysis.

4. When was nurse pulse palpation performed as mentioned in the abstract? There is no such information or results in the Results section of the paper.

Response: Based on previous reviews of this study, we have removed the nurse palpation data from this manuscript, as the nurses were not blinded to patient's AF status (where known), and should not have appeared in the Abstract which has nowbeen amended

5. How many measurements were taken using the WatchBP monitor to detect atrial fibrillation? How was the atrial fibrillation diagnosis defined by this method?

Response: Only a single reading was obtained for the WatchBP, as currently noted in the methods.

6. What is the cost of the three devices compared in this study?

Response: We have the costs of these devices, and if the Editor agrees, we could add these in. However, costs of devices fluctuate widely even within one country, so we are not sure that this would be particularly useful internationally for the readers. The UK costs of the 3 devices are: Omron HCG-801 portable cordless ECG £ 274.99 + VAT including software, Merlin £ 599 + VAT - including software, Microlife WatchBP Home A £ 89.99 + VAT.

7. Apart from the devices' cost, the cost of the doctor's time to interpret the ECG trace should be taken into account in the cost-effectiveness evaluation.

Response: We have added this to the Discussion section page 8